

ARIZONA DEPARTMENT OF WATER RESOURCES
Office of Assured and Adequate Water Supply
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Janet Napolitano
 Governor

Herbert R. Guenther
 Director

ANALYSIS OF ADEQUATE WATER SUPPLY

October 19, 2005

File Number: 23-401823.0000
Development: Golden Valley 5800
Location: Township 20 North, Range 18 West, Sections 2, 3, 4, 8, 9, 10, 11, 14, 16
 Township 21 North, Range 18 West, Section 34
 Mohave County, Arizona
Land Owner: American Land Management, L.L.C.

The Arizona Department of Water Resources has evaluated the Analysis of Adequate Water Supply application for Golden Valley 5800 pursuant to A.A.C. R12-15-723. The proposed development includes 32,000 single-family residential lots. Water provider for the master planned community has not yet been selected. Conclusions of the review are indicated below based on the adequate water supply criteria referenced in A.R.S. § 45-108 and A.A.C. R12-15-701, 715, 723 *et seq.*

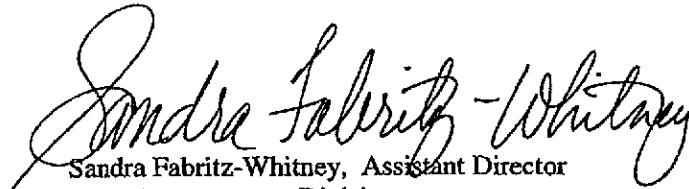
- **Physical, Continuous, and Legal Availability of Water for 100 Years**
 On the basis of the Department's review, the Department has determined that 9,000.00 acre-feet per year of groundwater will be **physically available**, which is less than the applicant's projected build out demands for the development, including system losses, of 15910.90 acre-feet per year. The application did not specify a provider, and the water provider has not yet been selected. Therefore, both **legal availability** and **continuous availability** of the water are not proven at this time. These requirements of an Analysis of Adequate Water Supply will be re-evaluated for each application for a Water Adequacy Report. Applications for Water Adequacy Reports that follow the Analysis of Adequate Supply will need to reference this letter to demonstrate physical availability. Individual Notices of Intent to Serve will be required for each application for a Water Adequacy Report.
- **Adequate Water Quality**
 Water quality has not been demonstrated at this time. This requirement of an Analysis of Adequate Water Supply will be re-evaluated for each application for a Water Adequacy Report.

Celebrating 25 Years

The term of this Analysis of Adequate Water Supply is ten years from the date of this letter and may be renewed upon request, subject to approval by the Department. Throughout the term of this determination, the projected demand of this development will be considered when reviewing other requests for adequate water supply in the area.

Prior to obtaining plat approval by the local platting authority and approval of the public report by the Department of Real Estate, a Water Adequacy Report must be obtained for each subdivision plat. The findings of this Analysis of Adequate Water Supply may be used to demonstrate that certain requirements for a Water Adequacy Report have been met. This determination may be invalidated if the development plan or other conditions change prior to filing for a Water Adequacy Report.

Questions may be directed to the Office of Assured/Adequate Water Supply at (602) 417-2465.



Sandra Fabritz-Whitney, Assistant Director
Water Management Division

cc: Greg Wallace, E. L. Montgomery and Associates
Alan R. Dulaney, Office of Assured/Adequate Water Supply

Appendix B

Water Demands Calculations
Facility Sizing Calculations

Water Demands Calculations |

Golden Valley Ranch

Potable Water Demand Calculation Spreadsheet

Goal:

To accurately estimate the potable water demands of Golden Valley Ranch, a proposed master planned community in Mohave County, Arizona.

Known:

From the Lotting Matrix (12/9/05):

- ◆ Total Dwelling Units = 33,180 units
 - ◆ Town Center Units = 10,000 units
 - ◆ Total Residential Units = 23,180 units
 - ◆ Active Adult Residential Units = 12,230 units
 - ◆ Conventional (Single Family) Residential Units = 8,175 units
 - ◆ Apartment Residential Units = 2,775 units
- ◆ Total Developable Acres = 4,050 acres
- ◆ Calculated Overall Density = 5.77 units/acre

Assumptions:

- ◆ Average Water Usage Rate Per Person = 150 gpcd (0.20 AFY)
- ◆ Persons per Active Adult Unit = 1.8 people
- ◆ Persons per Single Family Unit = 3.0 people
- ◆ Persons per Town Center Unit = 2.1 people
- ◆ Persons per Apartment Unit = 2.4 people
- ◆ Maximum Day Peaking Factor = 2.0
- ◆ Peak Hour Peaking Factor = 3.5
- ◆ Minimum January Day Peaking Factor = 0.391
- ◆ School (Average) Demand Factor = 2000 gpd/acre
- ◆ Commercial (Average) Demand Factor = 1750 gpd/acre

Golden Valley Ranch Potable Water Demands Per Phase

PHASE 1							
Parcel	Acreage	Land Use	Residential Units	Average Day Demand Factor (gpd/unit)	Average Day Demand (mgd)	Maximum Day Demand (mgd)	Peak Hour Demand (mgd)
1A	187.7	Active Adult	850	270	0.230	0.459	0.803
2A	204.2	Active Adult	815	270	0.220	0.440	0.770
3	104.9	Custom	150	450	0.068	0.135	0.236
4C	43.9	Conventional	271	450	0.122	0.244	0.427
5C	42.4	Conventional	262	450	0.118	0.236	0.413
7	85.5	Apartments	1539	360	0.554	1.108	1.939
8C	55.9	Conventional	315	450	0.142	0.284	0.496
9C	74.5	Conventional	332	450	0.149	0.299	0.523
10C	87.7	Conventional	388	450	0.175	0.349	0.611
11C	53.1	Conventional	289	450	0.130	0.260	0.455
54A	43.6	Active Adult	207	270	0.056	0.112	0.196
55A	47.3	Active Adult	208	270	0.056	0.112	0.197
59A	46.4	Active Adult	249	270	0.067	0.134	0.235
60A	74.7	Active Adult	413	270	0.112	0.223	0.390
61A	45.4	Active Adult	263	270	0.071	0.142	0.249
62A	28.0	Active Adult	169	270	0.046	0.091	0.160
Town Center		Town Center	1250	315	0.394	0.788	1.378
Park	14.0	Open Space	N/A	N/A	0.000	0.000	0.000
School	48.4	School	N/A	2000 gpd/acre	0.097	0.194	0.339
TOTAL	1,287.5		7,970		2.805	5.609	9.816

PHASE 2							
Parcel	Acreage	Land Use	Residential Units	Average Day Demand Factor (gpd/unit)	Average Day Demand (mgd)	Maximum Day Demand (mgd)	Peak Hour Demand (mgd)
15C	100.0	Conventional	511	450	0.230	0.460	0.805
16C	109.9	Conventional	606	450	0.273	0.545	0.954
17C	70.9	Conventional	311	450	0.140	0.280	0.490
18C	64.5	Conventional	354	450	0.159	0.319	0.558
19C	73.1	Conventional	388	450	0.175	0.349	0.611
20C	126.6	Conventional	710	450	0.320	0.639	1.118
21C	81.5	Conventional	366	450	0.165	0.329	0.576
Park	61.5	Open Space	N/A	N/A	0	0	0.000
Town Center		Town Center	5000	315	1.575	3.150	5.513
TOTAL	687.9		8,246		3.036	6.071	10.625

PHASE 3							
Parcel	Acreage	Land Use	Residential Units	Average Day Demand Factor (gpd/unit)	Average Day Demand (mgd)	Maximum Day Demand (mgd)	Peak Hour Demand (mgd)
33A	69.1	Apartments	1245	360	0.448	0.896	1.569
39A	38.4	Active Adult	191	270	0.052	0.103	0.180
40A	54.3	Active Adult	239	270	0.085	0.129	0.228
41A	117.5	Active Adult	652	270	0.176	0.352	0.616
42A	60.0	Active Adult	355	270	0.096	0.192	0.335
43A	100.4	Active Adult	462	270	0.125	0.249	0.437
44A	17.6	Active Adult	494	270	0.133	0.267	0.467
45A	84.0	Active Adult	393	270	0.106	0.212	0.371
46A	82.0	Active Adult	472	270	0.127	0.255	0.446
53A	64.7	Active Adult	284	270	0.077	0.153	0.268
Park	7.0	Open Space	N/A	N/A	0.000	0.000	0.000
Town Center		Town Center	2500	315	0.788	1.575	2.756
TOTAL	694.9		7,287		2.192	4.384	7.672

Golden Valley Ranch Potable Water Demands Per Phase

PHASE 4							
Parcel	Acreage	Land Use	Residential Units	Average Day Demand Factor (gpd/unit)	Average Day Demand (mgd)	Maximum Day Demand (mgd)	Peak Hour Demand (mgd)
22C	47.1	Conventional	270	450	0.122	0.243	0.425
23C	48.9	Conventional	244	450	0.110	0.220	0.384
24C	46.2	Conventional	264	450	0.119	0.238	0.416
25C	93.0	Conventional	535	450	0.241	0.482	0.843
26C	70.3	Conventional	297	450	0.134	0.267	0.468
27C	65.4	Conventional	299	450	0.135	0.269	0.471
28C	62.0	Conventional	316	450	0.142	0.284	0.498
29C	33.9	Conventional	217	450	0.098	0.195	0.342
30C	48.5	Conventional	0	450	0.000	0.000	0.000
31C	52.6	Conventional	0	450	0.000	0.000	0.000
32C	77.7	Conventional	0	450	0.000	0.000	0.000
Town Center		Town Center	1250	315	0.394	0.788	1.378
Commercial	37.1	Commercial	N/A	1,750 gpd/acre	0.065	0.130	0.227
TOTAL	682.6		3,692		1.558	3.115	5.452

PHASE 5							
Parcel	Acreage	Land Use	Residential Units	Average Day Demand Factor (gpd/unit)	Average Day Demand (mgd)	Maximum Day Demand (mgd)	Peak Hour Demand (mgd)
34A	81.0	Active Adult	466	270	0.126	0.252	0.440
35A	111.3	Active Adult	517	270	0.140	0.279	0.489
36A	89.1	Active Adult	524	270	0.141	0.283	0.495
37A	57.5	Active Adult	252	270	0.068	0.136	0.238
38A	61.8	Active Adult	298	270	0.080	0.161	0.282
TOTAL	400.7		2,057		0.555	1.111	1.944

PHASE 6							
Parcel	Acreage	Land Use	Residential Units	Average Day Demand Factor (gpd/unit)	Average Day Demand (mgd)	Maximum Day Demand (mgd)	Peak Hour Demand (mgd)
47A	119.0	Active Adult	555	270	0.150	0.300	0.524
48A	110.6	Active Adult	497	270	0.134	0.268	0.470
49A	19.0	Active Adult	122	270	0.033	0.066	0.115
50A	73.2	Active Adult	404	270	0.109	0.218	0.382
51A	57.9	Active Adult	331	270	0.089	0.179	0.313
52A	103.6	Active Adult	556	270	0.150	0.300	0.525
TOTAL	483.3		2,465		0.666	1.331	2.329

PHASE 7							
Parcel	Acreage	Land Use	Residential Units	Average Day Demand Factor (gpd/unit)	Average Day Demand (mgd)	Maximum Day Demand (mgd)	Peak Hour Demand (mgd)
6C	85.0	Conventional	489	450	0.220	0.440	0.770
12C	40.8	Conventional	0	450	0.000	0.000	0.000
13C	33.9	Conventional	0	450	0.000	0.000	0.000
14C	39.9	Conventional	0	450	0.000	0.000	0.000
56A	83.8	Active Adult	482	270	0.130	0.260	0.455
57A	52.2	Active Adult	311	270	0.084	0.168	0.294
58A	29.2	Active Adult	181	270	0.049	0.098	0.171
Regional Park	152.3	Open Space	N/A	N/A	0	0	0.000
Commercial	92.5	Commercial	N/A	N/A	0.162	0.324	0.566
TOTAL	609.6		1,463		0.645	1.290	2.257

GRAND TOTAL	4,846.4		33,180		11.46	22.91	40.10
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Golden Valley Ranch Potable Water Demands Per Pressure Zone

2850 PRESSURE ZONE							
Parcel	Acreage	Land Use	Residential Units	Average Day Demand Factor (gpd/unit)	Average Day Demand (mgd)	Maximum Day Demand (mgd)	Peak Hour Demand (mgd)
7	85.53	Apartments	1539	360	0.554	1.108	1.939
8C	55.86	Conventional	315	450	0.142	0.284	0.496
9C	74.52	Conventional	332	450	0.149	0.299	0.523
18C	64.47	Conventional	354	450	0.159	0.319	0.558
19C	73.09	Conventional	388	450	0.175	0.349	0.611
20C	126.60	Conventional	710	450	0.320	0.639	1.118
Park	7.00	Open Space	N/A	N/A	0	0.0	0.0000
School	48.38	School	N/A	2000 gpd/acre	0.097	0.194	0.339
TOTAL	535.45		3,638		1.595	3.191	5.584

2750 PRESSURE ZONE							
Parcel	Acreage	Land Use	Residential Units	Average Day Demand Factor (gpd/unit)	Average Day Demand (mgd)	Maximum Day Demand (mgd)	Peak Hour Demand (mgd)
2A	204.20	Active Adult	815	270	0.220	0.440	0.770
3	104.89	Custom	150	450	0.068	0.135	0.236
4C	43.90	Conventional	271	450	0.122	0.244	0.427
5C	42.41	Conventional	262	450	0.118	0.236	0.413
6C	84.99	Conventional	489	450	0.220	0.440	0.770
10C	87.66	Conventional	388	450	0.175	0.349	0.611
11C	53.12	Conventional	289	450	0.130	0.260	0.455
12C	40.77	Conventional	0	450	0.000	0.000	0.000
13C	33.91	Conventional	0	450	0.000	0.000	0.000
14C	39.94	Conventional	0	450	0.000	0.000	0.000
15C	99.99	Conventional	511	450	0.230	0.460	0.805
16C	109.87	Conventional	606	450	0.273	0.545	0.954
17C	70.93	Conventional	311	450	0.140	0.280	0.490
21C	81.50	Conventional	366	450	0.165	0.329	0.576
22C	47.11	Conventional	270	450	0.122	0.243	0.425
23C	48.88	Conventional	244	450	0.110	0.220	0.384
24C	46.20	Conventional	264	450	0.119	0.238	0.416
25C	93.04	Conventional	535	450	0.241	0.482	0.843
26C	70.30	Conventional	297	450	0.134	0.267	0.468
27C	65.36	Conventional	299	450	0.135	0.269	0.471
28C	61.97	Conventional	316	450	0.142	0.284	0.498
29C	33.86	Conventional	217	450	0.098	0.195	0.342
30C	48.52	Conventional	0	450	0.000	0.000	0.000
31C	52.57	Conventional	0	450	0.000	0.000	0.000
32C (50%)	38.84	Conventional	0	225	0.000	0.000	0.000
61A	45.38	Active Adult	263	270	0.071	0.142	0.249
62A	28.00	Active Adult	169	270	0.046	0.091	0.160
Park	213.79	0	0	0	0.000	0.000	0.000
Town Center	0.00	Town Center	10000	315	3.150	6.300	11.025
Commercial	37.11	Commercial	N/A	N/A	0.065	0.130	0.227
Commercial	92.48	Commercial	N/A	N/A	0.162	0.324	0.566
TOTAL	2121.49		17,332		6.452	12.903	22.581

Golden Valley Ranch

Potable Water Demands Per Pressure Zone

2650 PRESSURE ZONE							
Parcel	Acreage	Land Use	Residential Units	Average Day Demand Factor (gpd/unit)	Average Day Demand (mgd)	Maximum Day Demand (mgd)	Peak Hour Demand (mgd)
1A	187.70	Active Adult	850	270	0.230	0.459	0.803
33A	69.13	Apartments	1245	360.00	0.448	0.896	1.569
34A	80.96	Active Adult	466	270.00	0.126	0.252	0.440
35A	111.27	Active Adult	517	270.00	0.140	0.279	0.489
36A	89.13	Active Adult	524	270.00	0.141	0.283	0.495
37A	57.54	Active Adult	270.0	252.0	0.068	0.136	0.238
38A	61.80	Active Adult	298	270.00	0.080	0.161	0.282
39A	38.42	Active Adult	191	270.00	0.052	0.103	0.180
40A	54.26	Active Adult	239	270.00	0.065	0.129	0.226
41A	117.45	Active Adult	652	270.00	0.176	0.352	0.616
42A	59.95	Active Adult	355	270.00	0.096	0.192	0.335
43A	100.41	Active Adult	462	270.00	0.125	0.249	0.437
44A	17.56	Active Adult	494	270.00	0.133	0.267	0.467
45A	83.99	Active Adult	393	270.00	0.106	0.212	0.371
46A	82.00	Active Adult	472	270.00	0.127	0.255	0.446
47A	118.95	Active Adult	555	270.00	0.150	0.300	0.524
48A	110.60	Active Adult	497	270.00	0.134	0.268	0.470
49A	18.99	Active Adult	122	270.00	0.033	0.066	0.115
50A	73.19	Active Adult	404	270.00	0.109	0.218	0.382
51A	57.92	Active Adult	331	270.00	0.089	0.179	0.313
52A	103.64	Active Adult	556	270.00	0.150	0.300	0.525
53A	64.69	Active Adult	284	270.00	0.077	0.153	0.268
54A	43.55	Active Adult	207	270.00	0.056	0.112	0.196
55A	47.34	Active Adult	208	270.00	0.056	0.112	0.197
56A	83.79	Active Adult	482	270.00	0.130	0.260	0.455
57A	52.15	Active Adult	311	270.00	0.084	0.168	0.294
58A	29.20	Active Adult	181	270.00	0.049	0.098	0.171
59A	46.38	Active Adult	249	270.00	0.067	0.134	0.235
60A	74.65	Active Adult	413	270	0.112	0.223	0.390
32C (50%)	38.84	Conventional	0	225.00	0.000	0.000	0.000
Park	14.00	Open Space	0	N/A	0	0.0	0.0000
TOTAL	2189.45		12,228		3.409	6.818	11.931
GRAND TOTAL	4846.38		33198.00		11.456	22.912	40.095

Golden Valley Ranch Potable Water Demand Summary

	Average Day Demand (mgd)			Average Day Demand (gpm)			
Pressure Zone	Golden Valley South	Offsite	Ultimate	Golden Valley South	Offsite	Ultimate	H20 Map Node ID
2850	1.6	1.9	3.5	1,108	1,330	2,438	746, 728
2750	6.5	0.8	7.2	4,480	535	5,016	600
2650	3.4	2.6	6.0	2,367	1,792	4,159	748, 608
	11.5	5.3	16.7	7,955	3,657	11,613	

	Maximum Day Demand (mgd)			Maximum Day Demand (gpm)			
Pressure Zone	Golden Valley South	Offsite	Ultimate	Golden Valley South	Offsite	Ultimate	H20 Map Node ID
2850	3.2	3.8	7.0	2,216	2,659	4,875	746, 728
2750	12.9	1.5	14.4	8,961	1,071	10,032	600
2650	6.8	5.2	12.0	4,734	3,584	8,319	748, 608
	22.9	10.5	33.4	15,911	7,315	23,225	

	Peak Hour Demand (mgd)			Peak Hour Demand (gpm)			
Pressure Zone	Golden Valley South	Offsite	Ultimate	Golden Valley South	Offsite	Ultimate	H20 Map Node ID
2850	5.6	6.7	12.3	3,878	4,651	8,532	746, 728
2750	22.6	2.7	25.3	15,681	1,873	17,555	600
2650	11.9	9.0	21.0	8,285	6,268	14,558	748, 608
	40.1	18.4	58.5	27,844	12,793	40,645	

Average Offsite Demand (gpd) = (# Acres) * (6 Units/Acre) * (2.4 Capita/Unit) * (150 gpd/Capita)

Maximum Day = 2.0 x Average Day

Peak Hour = 3.5 x Average Day

Facility Sizing Calculations |

Golden Valley Reservoir Sizing (Pressure Zone 2850, 2750, 2650)

	Golden Valley Ranch			Offsite			TOTAL		
	Zone 2850								
Equation 1.	Max Day (mgd)	Peak Hour (mgd)	Volume Required	Max Day (mgd)	Peak Hour (mgd)	Volume Required	Max Day (mgd)	Peak Hour (mgd)	Volume Required
Equation 2.	3.191	5.584	1,197,000	3.830	6.702	1,436,000	7.020	12.286	4,000,000
			1,798,000			1,918,000			
	Zone 2750								
Equation 1.	Max Day (mgd)	Peak Hour (mgd)	Volume Required	Max Day (mgd)	Peak Hour (mgd)	Volume Required	Max Day (mgd)	Peak Hour (mgd)	Volume Required
Equation 2.	12.903	22.581	4,839,000	1.542	2.699	578,000	14.446	25.280	6,300,000
			3,619,000			1,489,000			
	Zone 2650								
Equation 1.	Max Day (mgd)	Peak Hour (mgd)	Volume Required	Max Day (mgd)	Peak Hour (mgd)	Volume Required	Max Day (mgd)	Peak Hour (mgd)	Volume Required
Equation 2.	6.818	11.931	2,557,000	5.161	9.032	1,935,000	11.979	20.963	5,000,000
			2,478,000			2,168,000			

Reservoir volume based on the larger volume generated by following two equations:

1. $V = 2 * (\text{Peak Hour Demand} - \text{Max Day Demand}) * 6 \text{ Hours}$
2. $V = (\text{Peak Hour Demand} - \text{Max Day Demand}) * 6 \text{ Hours} + \text{Fire Flow} * 4 \text{ Hours}$

Note and assumptions:

1. Fire Flow = 5,000 gpm * 60 min * 4 hrs = 1.2 MG
2. 25' reservoir depth.
3. Final reservoir volumes were rounded up to the nearest 0.25 million gallons.

Golden Valley Required Wells (Pressure Zone 2850, 2750, 2650)

	Required Number of Wells @ 1,500 gpm/well	
Pressure Zone	Golden Valley	Offsite
2850	2	2
2750	6	1
2650	4	3
Total	12	6

Appendix C

Water Model Output